

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. **(Currently Amended)** A method of detecting a leak of external air into a plasma reactor, comprising:

prior to establishing a plasma inside a chamber of a reactor and without a wafer in the chamber, removing nitrogen-based compounds from the chamber of the reactor ~~and maintaining an atmosphere in the chamber;~~

establishing, without a wafer in the chamber, a plasma inside the chamber of the reactor, the plasma being configured with a composition suitable to generate at least one predetermined compound when reacting with at least one air constituent, wherein the predetermined compound is indicative of an air leak into the chamber,

detecting, without a wafer in the chamber, a light emission of the plasma inside the chamber, and

analyzing the light emission to identify the presence of the at least one predetermined compound having been generated from a reaction with at least one air constituent in the chamber from an air leak into the chamber.

2. (Previously Presented) The method according to claim 1, further including, prior to the step of removing nitrogen-based compounds from the chamber, the steps of:

processing at least one wafer of semiconductor material, and

removing the at least one wafer from the reactor.

3. (Original) The method according to claim 1, wherein the establishing the plasma inside the reactor includes providing a flow of a gas including a fluorocarbon constituent.

4. (Original) The method according to claim 3, wherein the establishing the plasma inside the reactor further includes:

keeping the gas at a pressure substantially in the range from 50mtorr to 110mtorr, and applying a source power substantially in the range from 400W to 600W.

5. (Previously Presented) The method according to claim 3, wherein the air includes nitrogen, wherein the at least one predetermined compound results from a reaction of nitrogen with the plasma, and wherein the fluorocarbon constituent of the gas facilitates the reaction of the nitrogen with the plasma.

6. (Original) The method according to claim 3, wherein the fluorocarbon constituent is CF_4 .

7. (Original) The method according to claim 1, wherein the establishing the plasma inside the reactor includes providing a flow of a gas including a hydrocarbon constituent.

8. (Original) The method according to claim 7, wherein the hydrocarbon constituent is CH_4 .

9. (Original) The method according to claim 7, wherein the establishing the plasma inside the reactor further includes:

keeping the gas at a pressure substantially in the range from 50mtorr to 110mtorr, and applying a source power substantially in the range from 400W to 600W.

10. (Canceled)

11. (Previously Presented) The method according to claim 7, wherein the air includes nitrogen, wherein the at least one predetermined compound results from a reaction of nitrogen with the plasma, and wherein the hydrocarbon constituent of the gas facilitates the reaction of the nitrogen with the plasma.

12. (Original) The method according to claim 11, wherein the at least one predetermined compound is CN .

13. **(Currently Amended)** A computer readable medium comprising computer instructions for a data processing system, the computer instructions comprising instructions for:

prior to establishing a plasma inside a chamber of a reactor and without a wafer in the chamber, removing nitrogen-based compounds from the chamber of the reactor ~~and maintaining an atmosphere in the chamber;~~

establishing, without a wafer in the chamber, a plasma inside the chamber of the reactor, the plasma being configured with a composition suitable to generate at least one predetermined compound when reacting with at least one air constituent, wherein the predetermined compound is indicative of an air leak into the chamber,

detecting, without a wafer in the chamber, a light emission of the plasma inside the chamber, and

analyzing the light emission to identify the presence of the at least one predetermined compound having been generated from a reaction with at least one air constituent in the chamber from an air leak into the chamber.

14. (Previously Presented) The computer readable medium of claim 13, further including computer instructions comprising instructions for:

prior to removing nitrogen-based compounds from the chamber:

processing at least one wafer of semiconductor material, and

removing the at least one wafer from the reactor.

15. (Original) The computer readable medium of claim 13, wherein the establishing the plasma inside the reactor includes providing a flow of a gas including a fluorocarbon constituent.

16. (Original) The computer readable medium of claim 15, wherein the establishing the plasma inside the reactor further includes:

keeping the gas at a pressure substantially in the range from 50mtorr to 110mtorr, and applying a source power substantially in the range from 400W to 600W.

17. (Previously Presented) The computer readable medium of claim 15, wherein the air includes nitrogen, and wherein the at least one predetermined compound results from the reaction of nitrogen with the plasma.

18. (Original) The computer readable medium of claim 15, wherein the fluorocarbon constituent is CF₄.

19. (Original) The computer readable medium of claim 13, wherein the establishing the plasma inside the reactor includes providing a flow of a gas including a hydrocarbon constituent.

20. (Original) The computer readable medium of claim 19, wherein the hydrocarbon constituent is CH₄.

21. (Original) The computer readable medium of claim 19, wherein the establishing the plasma inside the reactor further includes:

keeping the gas at a pressure substantially in the range from 50mtorr to 110mtorr, and applying a source power substantially in the range from 400W to 600W.

22. (Canceled)

23. (Previously Presented) The computer readable medium of claim 19, wherein the air includes nitrogen, and wherein the at least one predetermined compound results from the reaction of nitrogen with the plasma.

24. (Original) The computer readable medium of claim 23, wherein the at least one predetermined compound is CN.

25. **(Currently Amended)** An apparatus comprising:

means for removing, without a wafer in the chamber, nitrogen-based compounds from a chamber of a plasma reactor prior to establishing a plasma inside the chamber of the reactor; ~~and wherein an atmosphere is maintained in the chamber;~~

means for establishing, without a wafer in the chamber, a plasma inside the plasma reactor, the plasma being configured with a composition suitable to generate at least one predetermined compound when reacting with at least one air constituent, wherein the predetermined compound is indicative of an air leak into the chamber;

means for detecting, without a wafer in the chamber, a light emission of the plasma inside the chamber; and

means for analyzing the light emission to identify the presence of the at least one predetermined compound having been generated from a reaction with at least one air constituent in the chamber from an external air leak into the chamber for detecting the leak of external air into the chamber of the plasma reactor.

26. (Original) The apparatus of claim 25, wherein the means for establishing the plasma inside the plasma reactor includes means for providing a flow of a gas including a fluorocarbon constituent.

27. (Original) The apparatus of claim 25, wherein the means for establishing the plasma inside the plasma reactor further includes:

means for keeping the gas at a pressure substantially in the range from 50mtorr to 110mtorr; and

means for applying a source power substantially in the range from 400W to 600W.

28. (Original) The apparatus of claim 25, wherein the means for establishing the plasma inside the plasma reactor includes means for providing a flow of a gas including a hydrocarbon constituent.

29. **(Currently Amended)** A system comprising:

a plasma reactor; and

an apparatus, coupled to the plasma reactor, for detecting a leak of external air into the plasma reactor, the apparatus comprising:

means for removing, without a wafer in the chamber, nitrogen-based compounds from a chamber of the plasma reactor prior to establishing a plasma inside the chamber of the reactor ~~and wherein an atmosphere is maintained in the chamber;~~

means for establishing, without a wafer in the chamber, a plasma inside the plasma reactor, the plasma being configured with a composition suitable to generate at least one predetermined compound when reacting with at least one air constituent, wherein the predetermined compound is indicative of an air leak into the chamber,

means for detecting, without a wafer in the chamber, a light emission of the plasma inside the chamber; and

means for analyzing the light emission to identify the presence of the at least one predetermined compound having been generated from a reaction with at least one air constituent in the chamber from an external air leak into the chamber for detecting the leak of external air into the chamber of the plasma reactor.

30. (Original) The system of claim 29, wherein the means for establishing the plasma inside the plasma reactor includes means for providing a flow of a gas including a fluorocarbon constituent.

31. (Original) The system of claim 29, wherein the means for establishing the plasma inside the plasma reactor includes means for providing a flow of a gas including a hydrocarbon constituent.

32. (Canceled)

33. (Previously Presented) The method according to claim 5, wherein the at least one predetermined compound is CN.